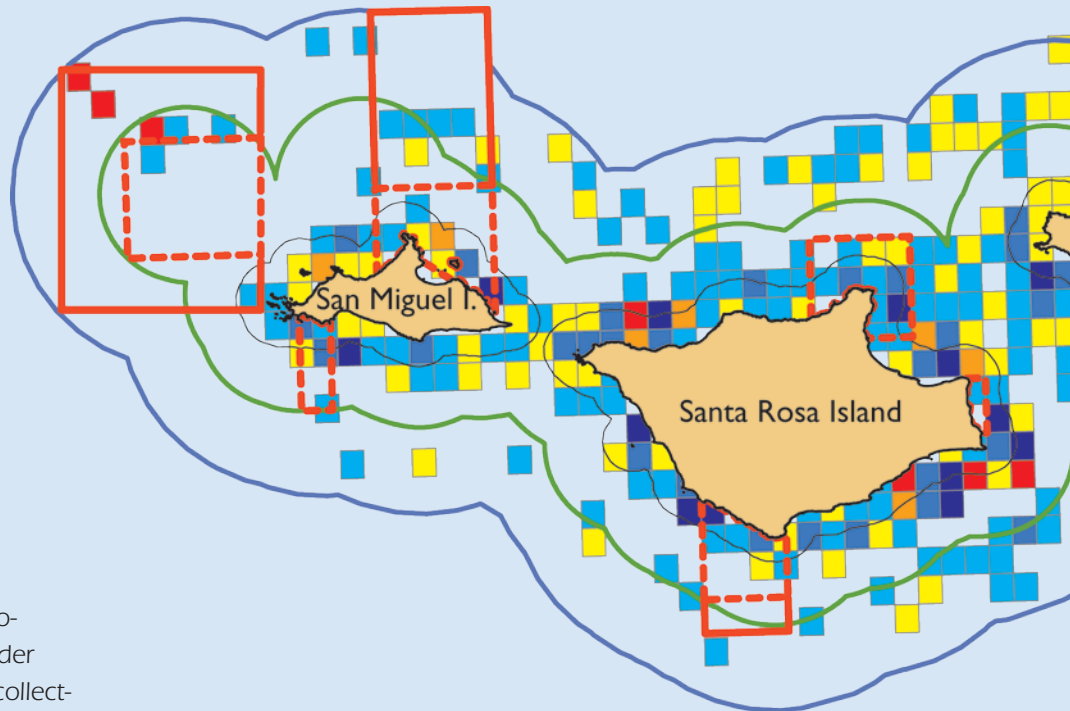


socioeconomic monitoring

Overview

Establishment of MPAs at the Channel Islands not only affects fish, invertebrates, and kelp, but people too. For example, fishermen may no longer cast their lines and nets in marine reserves. Recreational divers might begin to visit the protected areas more often. And the region's economy might be positively or negatively affected. The California Department of Fish and Game, Channel Islands National Marine Sanctuary, and Channel Islands National Park are committed to monitoring the relationship between MPAs and humans. The sanctuary hired a social science coordinator who, with years of stakeholder input, developed a scientific plan for collecting data on human uses. The goal is to identify the effects of marine reserves on where human activities occur; local and regional economic values; and knowledge, attitudes, and perceptions of users. Monitored human activities fall into 4 categories: consumptive (such as commercial fishing, recreational fishing, and spear fishing), non-consumptive (such as kayaking, sailing, and diving), passive (such as learning about the MPAs through reading), and education and research (such as lectures and field trips).



0 10 20 Miles
0 10 20 Kilometers

For legend of jurisdictional boundaries, see map on page 2.

Key Questions

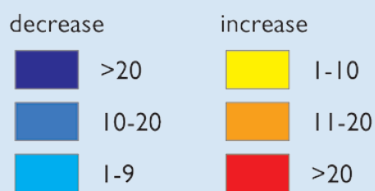
- Where have fishing and other activities occurred at the Channel Islands before and after MPAs were established?
- How have commercial and recreational fisheries changed since implementation of MPAs, including distribution of boats, numbers of fishermen, and value of fisheries?
- How have MPAs affected where recreational boaters go and what they do at the Channel Islands?



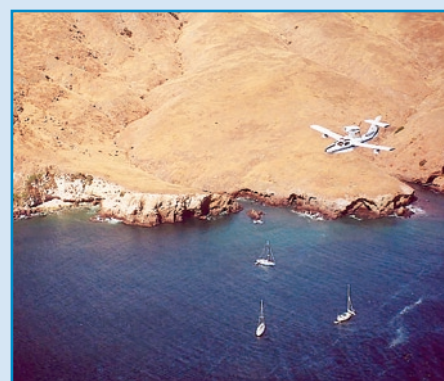
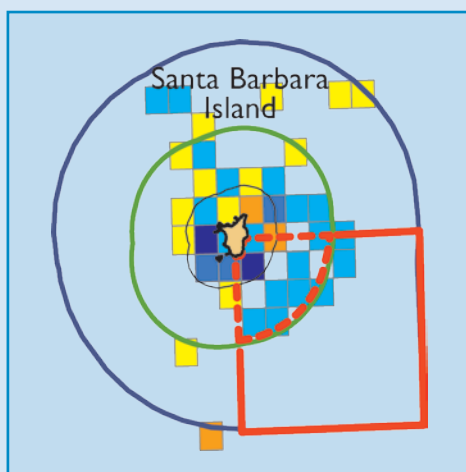
Ocean kayaker at the Channel Islands. Photo: Claire Fackler/NOAA



CHANGE IN NUMBER OF BOATS BEFORE AND AFTER MPAs*



*This map shows changes in total number of boats per block from before (1997-2003) and after (2003-2008) the establishment of MPAs.



Aerial survey over the Channel Islands.
Photo: NOAA

Key Findings

- The western Channel Islands tended to have more commercial boats than recreational boats. Most recreational boats went to the eastern Channel Islands, which are closer to mainland harbors.

After MPAs were established:

- Slightly fewer commercial fishing vessels were seen at the Channel Islands, while numbers of recreational vessels stayed about the same.
- The numbers of recreational and commercial fishing boats increased slightly in waters outside the MPAs. For example, more recreational fishing boats went to the south side of Anacapa Island, which is open to fishing.
- Conversely, the number of non-fishing recreational boats increased in a marine reserve at Santa Cruz Island.

Changes in Boat Distribution

Since 1997, scientists regularly conducted aerial surveys over the Channel Islands National Marine Sanctuary to monitor the numbers and locations of commercial and recreational boats. The Sanctuary Aerial Monitoring and Spatial Analysis Program (SAMSAP) also tracks whales and unusual conditions, such as oil spills. Observers distinguish between consumptive and non-consumptive, and recreational and commercial activities,

and they note the kinds of fishing gear that they see.

SAMSAP conducted 175 surveys between 1997 and 2006. Of those, 97 occurred before the state established MPAs in 2003, and 78 after. Most commercial vessels were seen near San Miguel and Santa Rosa Islands, while most recreational vessels were found near Anacapa and eastern Santa Cruz Islands, which are closer to harbors and

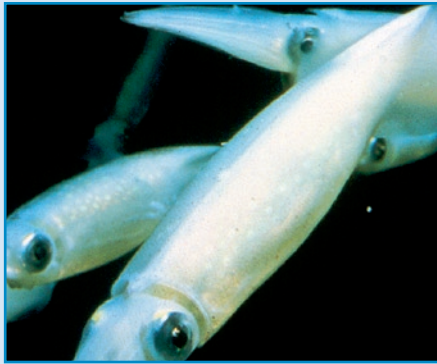
ports. After MPAs were established, the number of recreational fishing boats increased along the south side of Anacapa Island outside the MPAs. The number of non-consumptive recreational vessels, such as sailboats, increased in Scorpion Marine Reserve along the northeastern shore of Santa Cruz Island.

Data: SAMSAP. Analysis: N. Senyk, D. Greenberg, and B. Waltenberger.

Effects of MPAs on Commercial Fisheries



Gopher rockfish. Photo: © Annie Crawley



Market squid. Photo: Monterey Bay National Marine Sanctuary/NOAA



Commercial fishing vessel at the Channel Islands. Photo: Robert Schwemmer/NOAA

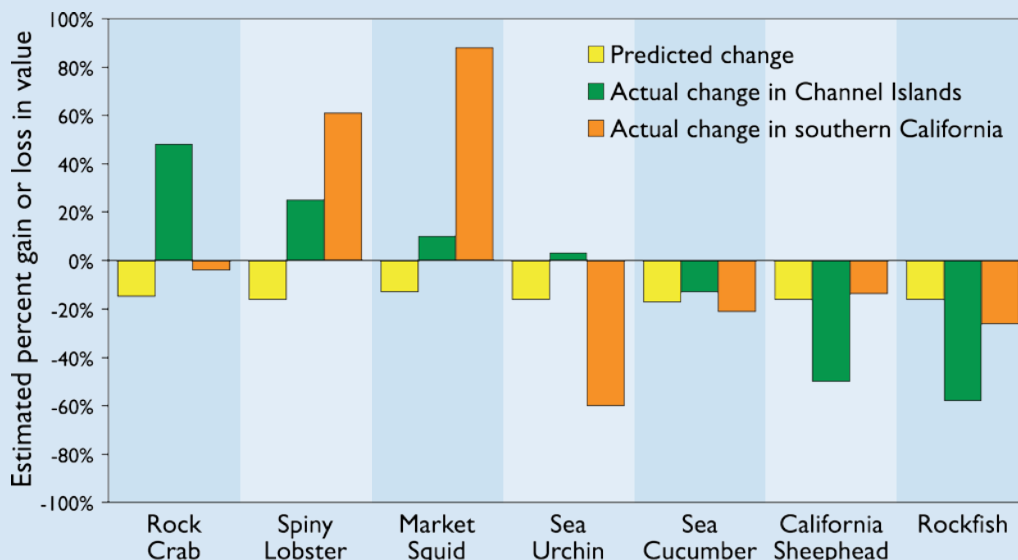
Some Fisheries Fared Well, Others Declined

The Channel Islands region has a long history of fishing and boating, with working harbors in Santa Barbara, Ventura, and Oxnard. Squid, spiny lobster, red sea urchin, rockfish, crab, California sheephead, flatfish, and sea cucumber now are the most valuable fisheries. Prior to the establishment of MPAs in 2003, economists predicted that these major commercial fisheries at the Channel Islands would decline in ex-vessel value up to 17% after the closures took effect.

Five years after MPA establishment, changes in 7 fisheries were analyzed. Three fisheries declined, including 2 that decreased more than predicted, and 4 fisheries increased, instead of declining as predicted. However, many factors beyond the MPAs played a role in these changes, including other regulations, environmental changes, and market forces.

To help take those factors into account, the scientists analyzed how well the fisheries in the Channel Islands fared compared to fisheries in the rest of southern California. The study determined that 2 of the 7 fisheries (sheephead and rockfish) declined in value more in the Channel Islands than they did in the rest of southern California, while 2 (California spiny lobster and squid) rose in value, but did so less than elsewhere. The remaining 3 fisheries fared better in the Channel Islands than the rest of southern California: Rock crab and sea urchin fisheries increased in the Channel Islands, while they decreased in the rest of California, and sea cucumber decreased less in the Channel Islands than elsewhere.

Data: California Department of Fish and Game. Analysis: M. Bergen, D. Aseltine-Neilson, and C. Valle.

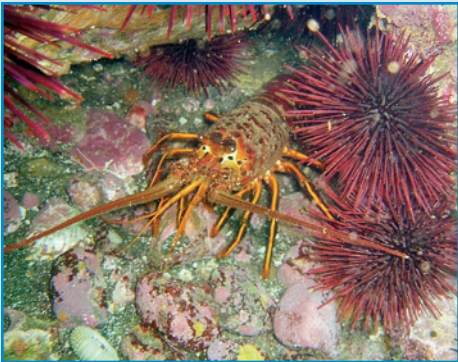


Key Findings

- Changes in commercial fisheries are linked to environmental shifts, market forces, and changes in fishery regulations.
- Predictions suggested that MPAs would cause decreases in commercial fisheries, but these decreases were not realized for all fisheries.
- Of 7 fisheries studied, 4 fisheries increased and 3 declined in value since MPAs were established in 2003.
- Compared to the rest of southern California, at the Channel Islands after MPAs were established: rock crab and sea urchin fisheries increased more; lobster and squid fisheries increased less; the sea cucumber fishery declined less; and sheephead and rockfish fisheries declined more.

- Maximum potential loss, assuming loss of all fishery activity in proposed MPAs, estimated in 2002, before MPAs were implemented (from Leeworthy and Wiley 2002).
- Actual changes in value of fisheries at the Channel Islands, comparing 5-year averages before and after MPAs were established at the Channel Islands in 2003.
- Actual changes in value of fisheries in southern California, comparing 5-year averages before and after MPAs were established at the Channel Islands in 2003.

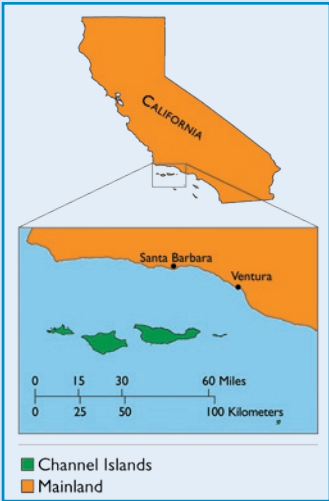
Case Study: Changes in the Commercial Spiny Lobster Fishery



California spiny lobster. Photo: Claire Fackler/NOAA



Commercial fisherman showing his catch. Photo: Carla Guenther



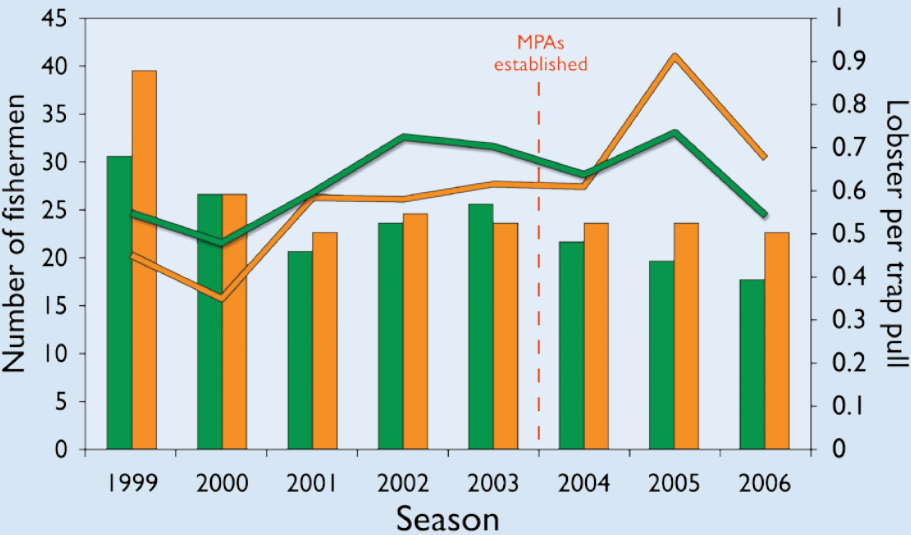
Study region at California's Channel Islands

Number of Fishermen and Catch per Unit Effort

Have state MPAs established in 2003 affected the commercial fishery for spiny lobster around the Channel Islands? To answer this question, a University of California, Santa Barbara, graduate student compiled 8 years of commercial lobster fishery logbook data from the California Department of Fish and Game and interviewed 70% of the fishermen in the region's lobster fleet. The logbooks spanned 5 years before and 3 years after MPA establishment.

The total number of lobster fishermen who fished at the Channel Islands and along the mainland coast in the vicinity of Santa Barbara and Ventura decreased from 43 to 36 during the 8-year period. Many fishermen used both the mainland and islands (graph, below). But since 2003, when MPAs were established at the Channel Islands, the number of fishermen operating at the islands (green bars) steadily decreased, while the number of fishermen along the mainland (orange bars) remained approximately the same. Prior to 2004, the seasonal average catch per unit effort (CPUE)—measured as number of lobster per trap pull—was higher at the Channel Islands than along the mainland. After 2004, the pattern reversed, and the seasonal average CPUE increased less at the Channel Islands as compared to the mainland. For example, fishermen at Santa Cruz Island caught 7–30% fewer lobster per trap pull after MPAs were established at the island. Changes in CPUE, effort, and fishing profits may be linked to experience, environmental fluctuations, and fishery regulations including MPAs.

Data: California Department of Fish and Game. Analysis: C. Guenther.



Key Findings

- The total number of lobster fishermen in the Santa Barbara region decreased between 1999 and 2002; the number of lobster fishermen around the Channel Islands decreased more than at the mainland since 2003.
- Before 2004, the seasonal average number of lobster per trap pull was higher at the islands, but since 2004 it has been higher along the mainland.
- Changes in the lobster fishery may be linked to changes in regulations, market forces, and environmental fluctuations.

Changes in Recreational Fishing



Fishermen enjoy recreational fishing at Anacapa Island. Photo: David Ono/DFG



A young angler displays her catch. Photo: Michelle Horeczko/DFG



Commercial passenger fishing vessel at the Channel Islands. Photo: David Ono/CDFG

Fishing Effort Shifted to Areas Outside MPAs

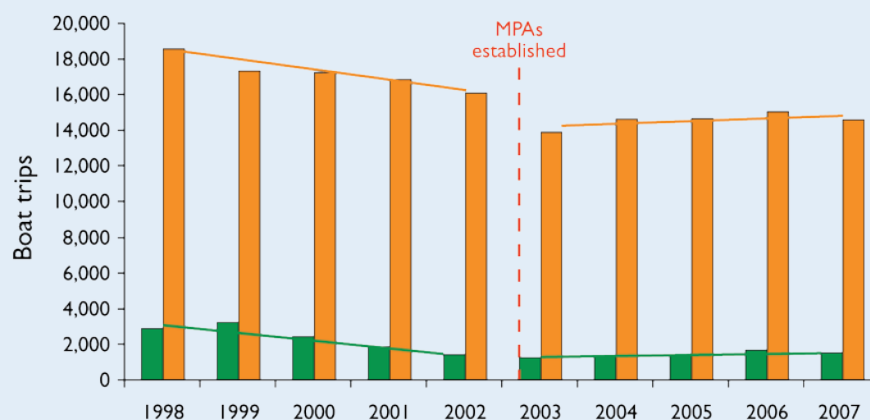
The northern Channel Islands are a popular fishing location for commercial passenger fishing vessels (CPFVs), also known as charter boats or party boats. Since MPAs were established in 2003, CPFVs made an average of 1,400 trips per year to the northern Channel Islands, carrying fewer than 10 to more than 100 anglers per trip. Using fishing logs and onboard observers, the California Department of Fish and Game collects data on the number of CPFV fishing trips, number of fish caught, and trip locations.

Logbook data show that CPFV trips per year to the northern Channel Islands and to other areas of southern California decreased between 1998 and 2003. Changes in fishing regulations and environmental conditions likely played roles in this decrease. Since MPAs were established in 2003, the annual number of CPFV trips to the Channel Islands and other places in southern California remained fairly constant. Onboard observer data from the islands showed that CPFVs shifted their fishing locations after MPA establishment. Previously, approximately 30% of their stops were inside areas that became MPAs. After 2003, only about 2% of the stops were inside MPAs that allow some recreational fishing. Although recreational fishing effort continued to be concentrated near Anacapa Island and Santa Cruz Island, it decreased on Anacapa's north side and Santa Cruz's northeast side, where MPAs were established. Meanwhile, recreational fishing effort increased south of those 2 islands and in the waters between them.

Data: California Department of Fish and Game. Analysis: C. Ryan, L. McGarvie, S. Owen, W. Dunlap, and A. Sadrozinski.

Key Findings

- The annual number of commercial passenger fishing vessel (CPFV) trips decreased throughout southern California between 1998 and 2003, before MPAs were established around the northern Channel Islands.
- Since 2003, the annual number of recreational CPFV fishing trips to the northern Channel Islands has remained fairly constant.
- After MPAs were established, recreational CPFV fishing effort did not decline but did shift from the areas that became MPAs to other areas still open to fishing.



- Annual number of commercial passenger fishing vessel (CPFV) trips in the northern Channel Islands
- Annual number of CPFV trips in the rest of southern California

Data from CPFV logbooks

How Do Recreational Boaters Use the Islands?



Fisherman enjoys "skurfing" on the wake of his vessel. Photo: Carla Guenther



Sailboat anchored at the Channel Islands. Photo: NOAA



A young sailor. Photo: C. LaFranchi

Favorite Activities: Relaxing, Exploring, Fishing

The public debate over MPAs often focuses on short-term impacts for consumptive users, such as recreational and commercial fisherman. This is, however, only part of the picture; effects on non-consumptive users are also important. Decision-makers need information on everyone affected by MPAs in order to make decisions that result in greater net economic value and social satisfaction.

To help provide this information, a team of social scientists conducted a study of private boaters in the Channel Islands National Marine Sanctuary and their activities, such as diving, kayaking, wildlife viewing, and exploring by dinghy. The researchers distributed postcard surveys by mail and at docks and launch ramps in Santa Barbara, Ventura, and Channel Islands harbors. They also conducted interviews with boaters at the islands.

Approximately 750 people responded to the postcard survey, and 85% said they visit the islands at least once per year. Santa Cruz Island is the most popular destination and is visited each year by 74% of the survey respondents. Boaters said they go to the Channel Islands because they offer solitude, nature, wildlife, and scenery, and they are close to home. Their favorite activities at the islands are relaxing, exploring using a dinghy, hook-and-line fishing, kayaking, and diving. They also enjoy socializing, snorkeling, hiking, beachcombing, and photography. Most boaters surveyed at overnight anchorages said they support the existing MPAs.

Data: Channel Islands National Marine Sanctuary, Coastal Ocean Values Center, and The Ocean Foundation. Analysis: C. LaFranchi, L. Pendleton, and A. Chan.



A couple enjoying the view. Photo: Claire Fackler/NOAA

Key Findings

- Boaters enjoy the Channel Islands because of the solitude, nature, wildlife, scenery, and proximity to home.
- The most common activities of boaters at the Channel Islands include relaxing, exploring using a dinghy, hook-and-line fishing, kayaking, and diving.
- Most boaters surveyed support MPAs at the Channel Islands.

Participation by Boaters in Recreational Activities (741 boaters)

